DISSERTATION ON

AN ANALYTICAL STUDY OF CARCINOMA ESOPHAGUS AND ITS SURGICAL MANAGEMENT

Dissertation submitted to the

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

In partial fulfillment of the regulations

for the award of the degree of

M.S. GENERAL SURGERY

(BRANCH I)

DEPARTMENT OF GENERAL SURGERY
THANJAVUR MEDICAL COLLEGE
THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

APRIL-2016

CERTIFICATE

This is to certify that this dissertation titled "**AN ANALYTICAL STUDY OF CARCINOMA ESOPHAGUS AND ITS SURGICAL MANAGEMENT**" is a bonafide research work done by

Dr.T.ILAVARASI, in the department of General Surgery,Thanjavur Medical college

, Thanjavur during his postgraduate course from 2013-2016. This is submitted as partial fulfillment for the requirement of M.S. degree examinations – Branch -I .(General Surgery)

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I solemnly declare that this Dissertation "**AN ANALYTICAL STUDY OF CARCINOMA ESOPHAGUS AND ITS SURGICAL MANAGEMENT** is a bonafide work done by me in Department of General Surgery, Thanjavur Medical College, and Hospital , Thanjavur during september 2013-june 2015 under the Guidance and Supervision of Professor Dr.M.ELANGOVAN,M.S., Department of General Surgery, Thanjavur Medical College, Thanjavur.

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CONTENT

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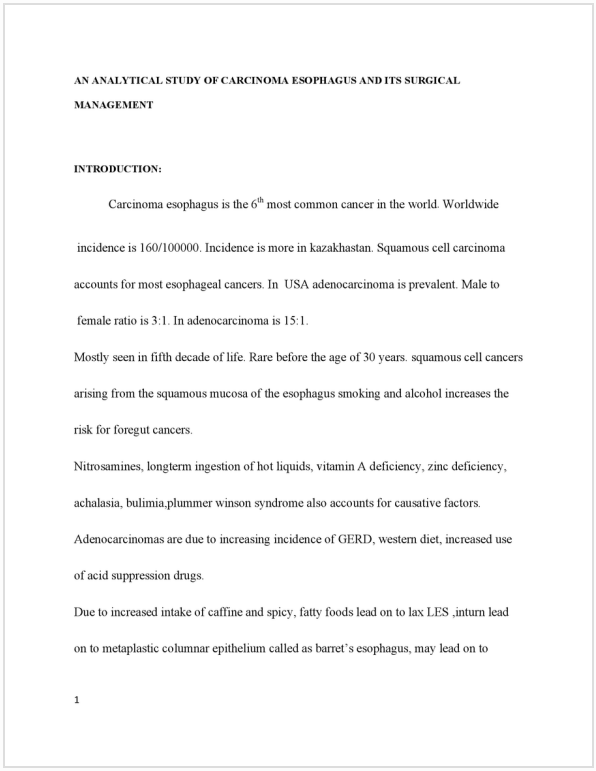

AN ANALYTICAL STUDY OF CARCINOMA ESOPHAGUS AND ITS SURGICAL MANAGEMENT

INTRODUCTION:

Carcinoma esophagus is the 6th most common cancer in the world. Worldwide incidence is 160/100000. Incidence is more in kazakhastan. Squamous cell carcinoma accounts for most esophageal cancers. In USA adenocarcinoma is prevalent. Male to female ratio is 3:1. In adenocarcinoma is 15:1.

Mostly seen in fifth decade of life. Rare before the age of 30 years. squamous cell cancers arising from the squamous mucosa of the esophagus smoking and alcohol increases the risk for foregut cancers.

Nitrosamines, longterm ingestion of hot liquids, vitamin A deficiency, zinc deficiency, achalasia, bulimia,plummer winson syndrome also accounts for causative factors.

Adenocarcinomas are due to increasing incidence of GERD, western diet, increased use of acid suppression drugs.

Due to increased intake of caffine and spicy, fatty foods lead on to lax LES ,inturn lead on to metaplastic columnar epithelium called as barret's esophagus, may lead on to

1

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ABBREVIATIONS

SCC – SQUAMOUS CELL CARCINOMA.

ADENO CA – ADENO CARCINOMA.

FJ – FEEDING JEJUNOSTOMY.

THE – TRANS HIATAL ESOPHAGECTOMY.

TLE – THORACO LAPAROSCOPIC ESOPHAGECTOMY.

TGE – TOTAL GASTRECTOMY WITH ESOPHAGECTOMY.

A – ALCOHOL.

S – SMOKING.

M – MIDDLE ONE THIRD.

L – LOWER ONE THIRD.

OGJ – OESOPHAGO GASRTIC JUNCTION.

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adenocarcinoma of the lower 1/3 of esophagus,and upto cardioesophagial junction. Histologically adenocarcinoma arising from three sites. They are submucosal glands,heterotopic islands of columnar epithelium,barret's esophagus. Patients with aerodigestive tract cancers have increased risk of developing squamous cell carcinoma in esophagus. Genetic alterations have also increased risk of developing carcinoma esophagus.

In recent years the improved standard of investigations and surgical technique and perioperative and post operative care substantial reduction in morbidity and mortality has been achieved.

But still most of the patients could not be diagnosed earlier because of the late Presention.

Study of the carcinoma esophagus is interesting because of its biological behavior. It infilterates locally, involves adjacent lymphnodes, and metastasizes widely by hematogenous spread.

The prognosis and survival rate is poor in esophageal carcinoma. Overall 5 year survival rate is with treated tumour is only 5-12%

AIM OF THE STUDY

The objectives of this prospective clinical study are

1) To know the incidence of carcinoma with regards to age, sex in our region

2) To study the common histological types of carcinoma esophagus

3) To know the clinical features & possible investigations to aid the diagnosis

4) To know the common site of carcinoma in esophagus

5) To know the operability of the carcinoma esophagus

HISTORY:

One of the earliest descriptions of esophageal cancer was in the second century AD, Galen described a fleshy obstructing growth in the esophagus, which was responsible for the inability to swallow and led to emaciation and death. In early Chinese literature, a patient who had esophageal cancer was described as “one suffers in autumn, and does not live to see the coming summer.”Improvement in treatment strategies has resulted in better outcome. However, most patients are still diagnosed at an advanced disease stage, with consequent poor prognosis. In 1877, Czerny was the first to successfully resect a cervical esophageal cancer and the patient lived for 15 months. Torek in 1913 performed the first successful transthoracic resection. A 67-year-old woman had a squamous cell cancer of the midesophagus, through a left thoracotomy, the esophagus was resected. The proximalcervical esophagus was brought out through an incision anterior to the sternocleidomastoid muscleand tunneled subcutaneously along the anterior chest wall, where a cutaneous esophagostomy was fashioned. The patient was fed via a rubber tube connecting the esophagostomy with a gastrostomy. The patient lived for 17 years. The first successful resection of a thoracic esophageal cancer with reconstruction using the stomach was performed by Ohsawa, a Japanese surgeon in Kyoto, who reported the technique in 18patients in 1933. In 1946, Lewis described esophageal resection using a two-phase approach via aright thoracotomy and laparotomy. Tanner independently also described the procedure in 1947.

Although surgical resection has remained the mainstay treatment for esophageal cancer,

Recent years have seen a proliferation of treatment options especially with regards to different combinations of chemotherapeutic agents, radiotherapy and surgery.

ANATOMY

EMBRYOLOGY

The development of the esophagus is among those remarkable feats, and a few moments to appreciate the product of years of precise development will establish a sound basis on which normal and abnormal esophageal form and function can be understood. The development of the esophagus begins in week 3 of gestational life , by the 14th week, the fetus takes its first swallow. To give life to the esophagus, there are several aspects of esophageal development that must be described carefully, initial formation of the gut tube, molecular regulation of the gut tube, differentiation of the endoderm (the lining of the esophagus), and derivation of the muscular layers from mesoderm.

GROSS ANATOMY:

The esophagus is a two-layered, mucosa-lined muscular tube that travels through the

neck, chest, and abdomen and lies in the posterior mediastinum.

It starts at the base of the pharynx at C6 and terminates in the abdomen, where it joins the cardia of the stomach at T11. Total length of esophagus is around 25 cm.

The cervical esophagus begins as a midline structure that deviates slightly to the left of the trachea At the level of the carina, it deviates to the right to accommodate the arch of the aorta. It then winds its way back under the left mainstem bronchus and remains slightly deviated to the left as it enters the diaphragm through the esophageal hiatus at the level of the 11th thoracic vertebra.

In the neck and upper thorax, the esophagus is secured between the vertebral column posteriorly and the trachea anteriorly.

At the level of the carina, the heart and pericardium lie directly anterior to the thoracic esophagus.

Immediately before entering the abdomen, the esophagus is pushed anteriorly by the descending thoracic aorta that accompanies the esophagus through the diaphragm into the abdomen separated by the median arcuate ligament.

The journey through the muscular esophagus begins and ends with two pressure zones, the upper (UES) and lower esophageal sphincter (LES).

The high-pressure zone at the inlet of the esophagus is the UES, which anatomically marks the end of a complex configuration of muscles that begins in the larynx and posterior pharynx and ends in the neck.

The pharyngeal constrictor muscles are three consecutive muscles that begin at the base of the palate and end at the crest of the esophagus.

The superior and middle pharyngeal constrictor muscles, as well as the oblique, transverse, and posterior cricoarytenoid muscles, are immediately proximal to the UES and serve to anchor the pharynx and larynx to structures in the mouth and palate. These muscles also aid in deglutition and speech, but are not responsible for the high pressures noted in the UES. The inferior pharyngeal constrictor muscle is the final bridge between the pharyngeal and esophageal musculature ,inserting into the median pharyngeal raphe, the inferior pharyngeal constrictor muscle is composed of two consecutive muscle beds—the thyropharyngeus and cricopharyngeus muscles—that originate bilaterally from the lateral portions of the thyroid and cricoids cartilages, respectively. The transition between the oblique fibers of the thyropharyngeus muscle and the horizontal fibers of the cricopharyngeus muscle creates a point of potential weakness, known as Killian's triangle.

The cricopharyngeus muscle is responsible for generating a high-pressure zone of muscle fibers is unique and serves to transition into the circular esophageal musculature.

This point of transition is flanked by the longitudinal esophageal muscles that extend superiorly to attach to the midportion of the

posterior surface of the cricoids cartilage and form the V-shaped area of Laimer.

ESOPHAGEAL LAYERS:

The esophagus is comprised of two proper layers, the mucosa and muscularis propria. It is distinguished from the other layers of the alimentary tract by its lack of a serosa. The mucosa is the innermost layer and consists of squamous epithelium for most of its course. The distal 1 to 2 cm of esophageal mucosa transitions to cardiac mucosa or junctional columnar epithelium at a point known as the Z-line .

The mucosa contains four layers ,the epithelium, basement membrane, lamina propria, and muscularis mucosae. Deep to the muscularis mucosa lays the submucosa Within it is a plush network of lymphatic and vascular structures, mucous glands and meissener's plexus.

The esophagus is composed of two concentric muscle bundles, an inner circular and outer longitudinal layers.

Both layers of the upper third of the esophagus are striated, whereas

the layers of the lower two thirds are smooth muscle. The circular muscles are an extension of the cricopharyngeus muscle and traverse through the thoracic cavity into the abdomen, where they become the middle circular muscles of the lesser curvature of the stomach. The collar of Helvetius marks the transition of the circular muscles of the esophagus to oblique muscles of the stomach at the incisura (cardiac notch).Between the layers of esophageal muscle is a thin septum comprised of connective tissue, blood vessels, and an interconnected network of ganglia known as Auerbach's plexus.

Enshrouding the inner circular layer, the longitudinal muscles of the esophagus begin at the cricoid cartilage and extend into the abdomen, where they join the longitudinal musculature of the cardia of the stomach.

DIVISIONS OF ESOPHAGUS:

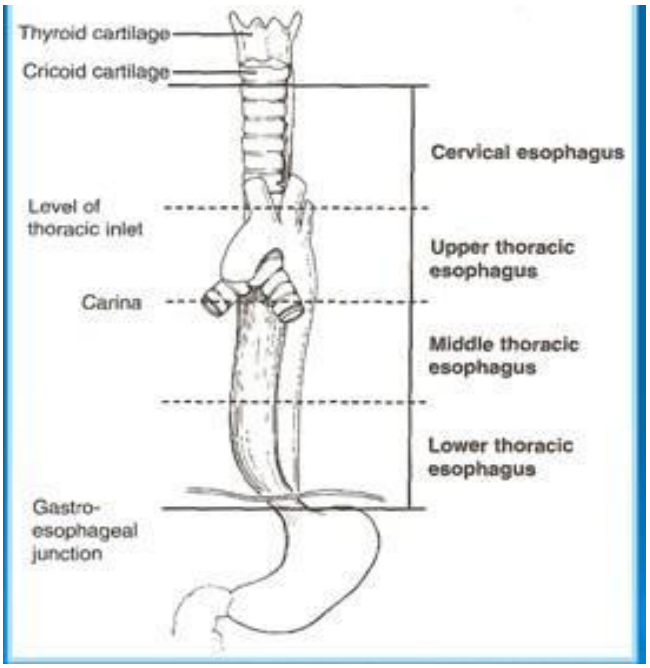
1.Cervical (lower border of cricoid cartilage to suprasternal notch / thoracic inlet, 5 cm long, begins 15 cm from incisors); contains striated muscle.

2.thoracic esophagus

- Upper thoracic (suprasternal notch to tracheal bifurcation, 5 cm long, begins 20 cm from incisors); has striated and smooth muscle
- Mid-thoracic (tracheal bifurcation to diaphragmatic hiatus, 5 cm long, begins 24 cm from incisors); has striated and smooth muscle
- Lower thoracic and abdominal (10 cm long, begins 30 cm from incisors); extends past diaphragm to its junction with stomach; has smooth muscle only.

3. abdominal

FIGURE: 1



ANATOMIC NARROWING:

The esophageal silhouette resembles an hourglass. There are three distinct areas of narrowing that contribute to its shape. Measuring 14 mm in diameter, the cricopharyngeus muscle is the narrowest point of the gastrointestinal tract and marks the superior most portion of the hourglass-shaped esophagus. Located just below the carina, where the left mainstem bronchus and aorta about the esophagus, the bronchoaortic constriction at the level of the fourth thoracic vertebra creates the center narrowing and measures 15 to 17 mm. Finally, the diaphragmatic constriction, measuring 16 to 19 mm, marks the inferior portion of the hourglass and is located where the esophagus joins the stomach.

Between these three distinct areas of anatomic constriction are two areas of dilation known as the superior and inferior dilations. Within these areas, the esophagus resumes the normal diameter for an adult and measures approximately 2.5 cm.

GASTROESOPHAGEAL JUNCTION

The UES and LES mark the entrance and exit to the esophagus, respectively. These sphincters are defined by a high-pressure zone. The UES corresponds reliably to the cricopharyngeus muscle, but the LES is near the gastro esophageal junction.

There are four anatomic points to identify the gastroesophageal junction (GEJ), two endoscopic and two external. Endoscopically, there are two anatomic considerations that may be used to identify the GEJ. The squamo columnar epithelial junction may mark the GEJ provided that the patient does not have a distal esophagus replaced by columnar-lined epithelium, as seen with Barrett's esophagus.

The transition from the smooth esophageal lining to the rugal folds of the stomach may also identify the GEJ accurately. Externally, the loop of Willis, where the circular muscular fibers of the esophagus join the oblique fibers of the stomach.

VASCULATURE:

The esophagus has rich vascular and lymphatic supply.

The vasculature is divided into three segments, they are

cervical, thoracic, and abdominal. The cervical esophagus receives its

blood supply from the inferior thyroid arteries, which is a branch of thyrocervical

trunk on the left and the subclavian artery on the right . The cricopharyngeus

muscle, which marks the inlet of the esophagus, is supplied by the superior thyroid

artery. The thoracic esophagus receives its blood supply directly from four to six

esophageal arteries coming off the aorta, as well as esophageal branches off the right and

left bronchial arteries. It is supplemented by descending branches off the inferior thyroid

arteries, intercostal arteries, and ascending branches of the paired inferior phrenic

arteries. The abdominal esophagus supplied by the left gastric artery

and paired inferior phrenic arteries.

All the arteries that supply blood to the esophagus terminate in a fine capillary network

before they penetrate the muscular wall of the esophagus. After penetrating and

supplying the muscular layers, the capillary network continues the length of the

esophagus within the submucosal layer.

The venous drainage parallels the arterial supply. In all parts of the esophagus, the rich submucosal venous plexus is the first basin for venous drainage of the esophagus. In the cervical esophagus, the submucosal venous plexus drains into the inferior thyroid veins, which are tributaries of the left subclavian vein and right brachiocephalic vein. The drainage of the thoracic esophagus is more intricate. The submucosal venous plexus of the thoracic esophagus joins with the more superficial esophageal venous plexus and the venae comitantes that envelop the esophagus at this level. This plexus, in turn, drains into the azygos and hemiazygos veins on the right and left sides of the chest, respectively. The intercostal veins also drain into the azygos venous system.

The abdominal esophagus drains into the systemic and portal venous systems through the left and right phrenic veins and left gastric (coronary) vein and short gastric veins, respectively.

FIGURE 2:

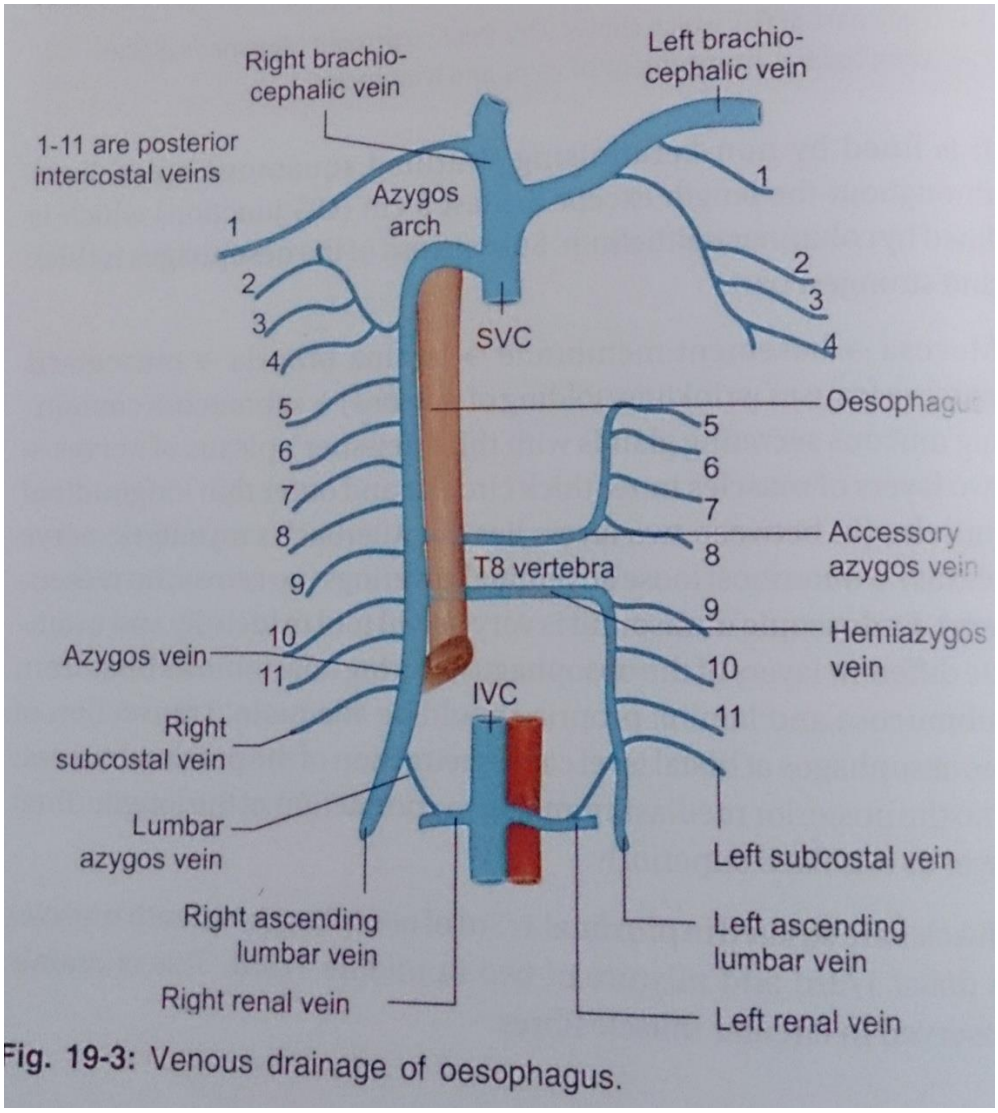


Fig. 19-3: Venous drainage of oesophagus.

LYMPHATICS:

The lymphatic drainage of the esophagus consists of two interconnecting lymphatic plexuses arising from the submucosa and muscularis layers. The submucosal lymphatics penetrate the muscularis propria and drain into the plexus that runs longitudinally in the esophageal wall. They then egress and drain into regional lymph node beds. In the upper two thirds of the esophagus, lymphatic flow is upward, whereas in the distal third, flow tends to be downward.

Esophageal lymphatics begin in the neck with drainage to the paratracheal lymph nodes anteriorly and deep lateral cervical and internal jugular nodes laterally and posteriorly. Once inside the chest, the lymphatics form a matrix of interconnecting channels that drain into the mediastinal lymph nodes and thoracic duct. Anteriorly, the paratracheal and subcarinal lymph nodes, and the paraesophageal, retrocardiac, and infracardiac nodes, all drain the esophagus.

Other mediastinal stations, such as the para-aortic and inferior pulmonary ligament nodes, can also receive drainage from the thoracic esophagus. Posteriorly, nodes along the esophagus and azygos veins are the primary sites of drainage.

The intricate lymphatic network of the esophagus, allows rapid spread of

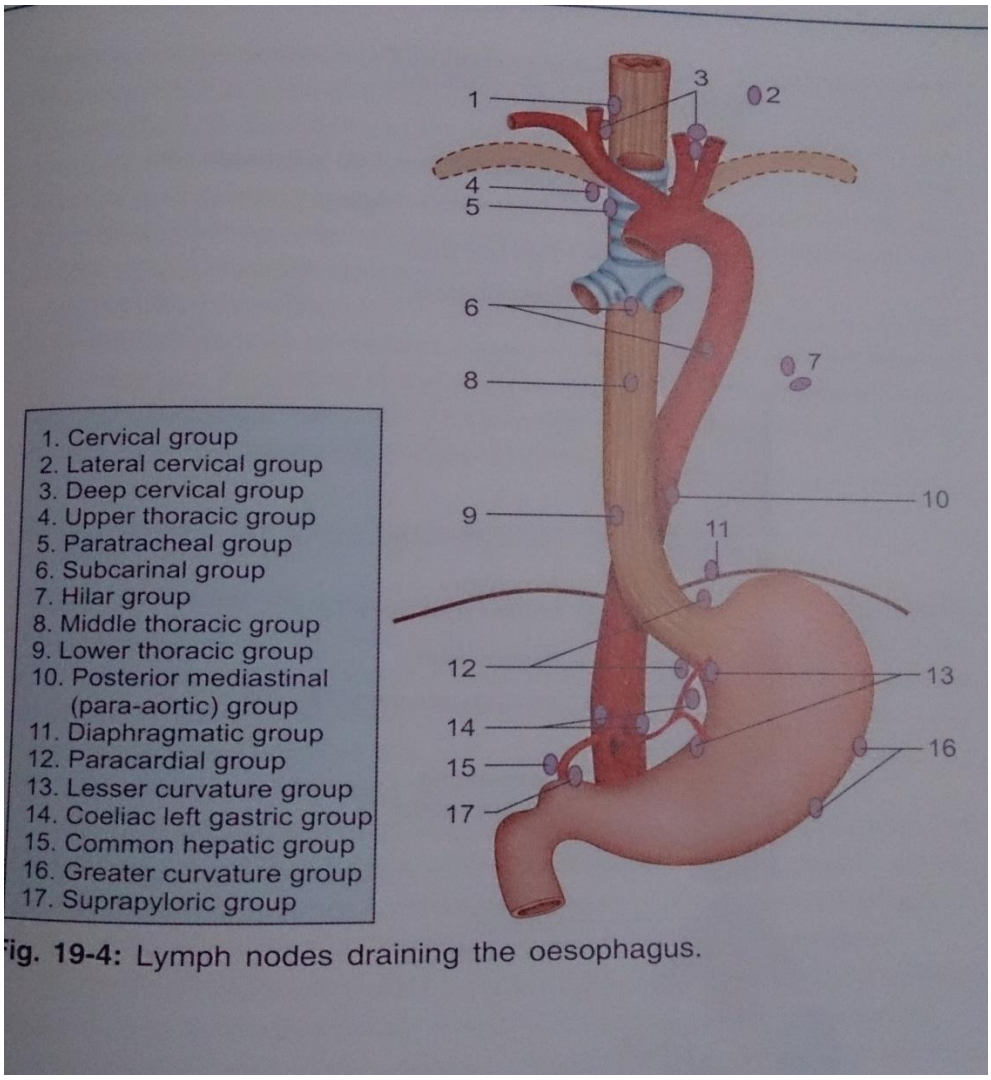
infection and tumor into three body cavities.

It stands to reason that the rich arterial supply to the esophagus makes it one of the more durable organs in the body with respect to surgical manipulation, whereas its comprehensive venous and lymphatic drainage create an oncologic challenge to controlling cellular migration.

These anatomic complexities lead to surgical challenges when treating esophageal cancer and other esophageal diseases.

FIGURE 3:

LYMPHATIC DRAINAGE OF ESOPHAGUS :



ig. 19-4: Lymph nodes draining the oesophagus.

INNERVATION

The innervation to the esophagus is sympathetic and parasympathetic . The cervical sympathetic trunk arises from the superior ganglion in the neck. It extends next to the esophagus into the thoracic cavity, where it terminates in the cervicothoracic ganglion.

Along the way, it gives off branches to the cervical esophagus. The thoracic sympathetic trunk continues on from the stellate ganglion, giving off branches to the esophageal plexus, which envelops the thoracic esophagus anteriorly and posteriorly. Inferiorly, the greater and lesser splanchnic nerves innervate the distal thoracic esophagus.

In the abdomen, the sympathetic fibers lay posteriorly alongside the left gastric artery. The parasympathetic fibers arise from the vagus nerve, which gives rise to the superior and recurrent laryngeal nerves. The superior laryngeal nerve branches into the external and internal laryngeal nerves that supply motor innervation to the inferior pharyngeal constrictor muscle and cricothyroid muscle and sensory innervation to the larynx, respectively. The right and left recurrent laryngeal nerves come off the vagus nerve and loop underneath the right subclavian artery and aortic arch, respectively.

They then travel upward in the tracheoesophageal groove to enter the larynx laterally underneath the inferior pharyngeal constrictor muscle. Along the way, they innervate the cervical esophagus, including the cricopharyngeus muscle.

Unilateral injury to the superior or recurrent laryngeal nerve results in hoarseness and aspiration from laryngeal and UES dysfunction. In the thorax, the vagus nerve sends fibers to the striated muscle and parasympathetic preganglionic fibers to the smooth muscle of the esophagus.

A weblike nervous plexus envelops the esophagus throughout its thoracic extent. These sympathetic and parasympathetic fibers penetrate through the muscular wall, forming networks between the muscle layers to become Auerbach's plexus and within the submucosal layer to become Meissner's plexus.

They provide an intrinsic autonomic nervous system within the esophageal wall that is responsible for peristalsis. The parasympathetic fibers coalesce 2 cm above the diaphragm into the left (anterior) and right (posterior) vagus nerves, which descend anteriorly onto the fundus and lesser curvature and posteriorly onto the celiac plexus, respectively.

PHYSIOLOGY

Chicago architect Louis Sullivan is well known for his progressive philosophy that for

should follow function. The primary function of the esophagus is to transport material from the pharynx to the stomach. Secondarily, the esophagus needs to constrain the amount of air that is swallowed and the amount of material that is refluxed. The esophagus usually measures 30 cm, extending from the pharynx down onto the cardia of the stomach. Under ideal physiologic conditions, the concentric muscular configuration permits effortless unidirectional flow of material from the top to the bottom of the esophagus. The UES, 4 to 5 cm in length, remains in a constant state of tone (mean, 60 mm Hg), preventing a steady flow of air into the esophagus. The tone in the LES (mean, 24 mm Hg) remains elevated just enough to prevent excessive food refluxing back up into the esophagus .

Transport of a food bolus from the mouth through the esophagus into the stomach begins with swallowing and ends with post relaxation contraction of the LES, requiring coordinated peristaltic contractions. The material in transit can move easily because the esophageal neuromuscular form provides all functions necessary to power the food bolus through three body cavities.

CARCINOMA ESOPHAGUS

EPIDEMIOLOGY

Carcinoma esophagus has the greatest variation in geographical distribution. Squamous

cell carcinoma is endemic in the Transkei region of South Africa and in the asian "cancer belt" extends up to middle asia, shores of Caspian sea to china. Highest incidence in the world is in Linxianin henan provine in china. There the incidence is more and it is the most common cause of death, 100/100000 population.

In linxian, supplementation of the diet with beta carotene,vitamin E, and selenium has been reduce the incidence Tobacco and alcohol are the major factors for squamous cell carcinoma. In western countries the incidence of adenocarcinoma is increasing. Incidence rate varies from various parts of the world. It is 5/100000 in USA to 26.5 in france. Increase in incidence of adenocarcinoma also noted.

ETIOLOGY

DIETARY:

Pickled vegetables, preserved meat, salted dry fish (rich in nitrosamines).

micro nutirient deficiency-vitamin A,B12,C,E,beta carotene.

Trace elements deficiency-Co,Cu,Mo,Zi.

ACQUIRED

Tobacco chewing

Smoking

Alcoholism

Chronic oesophagitis

Achlasia Cardia

Barret's esophagus

Corrosive strictures

Plummer Winson syndrome

Other aero digestive tract malignancy

HEREDITARY

Tylosis-autosomal dominant disorder charecterised by hyperkeratosis of palms and soles,

more prone for squamous cell carcinoms.

PATHOLOGY

SQUAMOUS CELL CARCINOMA

Squamous cell carcinoma accounts for the most of the upper and middle third of esophageal tumours. It arises from the esophageal mucosa and histologically it is characterized by invasive sheets of cells that run together and are polygonal, oval or spindle shaped with a distinct or ragged stromal epithelial interface.

They are mainly located in thoracic esophagus 60% of these tumours found in mid thoracic esophagus and 30% are in lower 1/3

Four major pathological presentations are,

1) Fungating type
2) Ulcerative variety
3) Infilterative variety

4) Polypoidal growth

ADENOCARCINOMA

It usually originates from the barett's esophagus following long standing gastroesophagial reflex and it is the most common type in U.S. It arises from the superficial & deep glands of esophagus mainly in lower third of esophagus, near the OG junction.

It may have 3 origins

1. Submucosal glands of the esophagus

2. Heterotopic islands of columnar epithelium

3. Malignant degeneration of metaplastic columnar epithelium.

Other uncommon malignancies of esophagus:

Both the squamous cell carcinomas and adenocarcinomas,accounts for 98% of all

malignancies of the esophagus. The remaining 2% comprises a variety of unusual tumors that can arise from different layers and structures within the esophagus, including the mucosa, submucosa, muscularis propria, and adventitia Among them, neuroendocrine tumors, carcinosarcomas, melanomas, and sarcomas are the most common. They each have distinct locations and characteristic patterns of spread

Neuroendocrine Tumors

They are small cell tumors that originate from the

1) argyrophilic or argentaffinic cells of the esophageal mucosa (or)

2) carcinoid tumors that arise from cells of the amine uptake and decarboxylation (APUD) system.

Small cell tumors are the most common of the unusual malignant tumors found in the esophagus. Both types of tumors are found primarily in the distal esophagus and carry a poor prognosis.

Carcinosarcomas

Carcinosarcomas are rare entities that are composed of carcinomatous and sarcomatous elements. The exact cause is not yet proven.

The number of theories prevail:

1. Collision theory, whereby two separate tumors collide and become one

2. Stem cell theory, whereby both types of cells originate from the same stem cell, with dedifferentiation of the carcinomatous cells into sarcomatous cells

3. Theory that the sarcomatous portion represents reactive hyperplasia, not malignancy

These lesions are often polypoid, are found in the lower two thirds of the esophagus, and carry a prognosis similar to their individual elements.

Malignant Melanomas

Malignant melanomas arise from malignant transformation of melanocytes in the mucosa .Which are superficial to the lamina propria.

They account for 17% of all unusual esophageal tumors. Presented as polypoid, ulcerated, pigmented mass in the lower two thirds of the esophagus.

Satellite lesions may also be present. More than 50% of patients present with metastatic disease at the time of diagnosis. They are most commonly found in the distal two thirds of the esophagus and usually carries poor prognosis if there is evidence of disease outside the esophagus.

Sarcomas

Sarcomas are a heterogeneous group of tumors that include leiomyosarcomas and Kaposi's, sarcoma. They constitute less then 1% of all unusual tumors.

Leiomyosarcomas are the most common and arise from the smooth muscle in the muscularis mucosa and muscularis propria.

CLINICAL FEATURES

The symptoms of esophageal cancer vary with the stage of the disease. Early

cancers may be asymptomatic or mimic symptoms of GERD. Heartburn, regurgitation, and indigestion are symptoms of reflux.

Most patients with esophageal cancer present with **dysphagia** and **weight loss,** that usually indicate advanced disease. Both are present in almost 80-90% of patients.

Because of the distensibility of the esophagus, a mass can obstruct two thirds of the lumen before symptoms of dysphagia are noted.

The symptoms of dysphagia and weight loss may be slowly progressive and well compensated for over a period of months. It is not until the esophageal lumen is narrowed from an average of 24 to 12 mm that dysphagia is noted.

Choking, coughing, and **aspiration** from a tracheoesophageal fistula, as well as **hoarseness** and **vocal cord paralysis** from direct invasion into the recurrent laryngeal nerve, are ominous signs of advanced disease. Systemic metastases to liver, bone, and lung can present with **jaundice, excessive pain,** and **respiratory distress.**

Rarely **severe bleeding** from erosion in to the aorta and pulmonary vessels may occur.

STAGING

Staging of the tumour is the critical step in determining the therapeutic option , and which is appropriate .staging done by American Joint Committee on Cancer. It is a TNM based system .The “T”(tumour) indicates the progressive degree of invasion of the tumour into the esophageal wall. “N” stands for the nodal status.”M” is for metastasis.

Prognosis and outcomes are determined by stage. Five year survival rate for esophageal cancers are stage I , 50 to 55% stage II, 15-30% stage III, 6-17% stage IV, less than 5%.

Lymph nodal staging may be assessed by endoscopic ultrasound, CT, PET scan, video assisted thoracoscopy and laparoscopy.

Primary Tumor (T)

Tx	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	High-grade dysplasia

T1	Tumor invades lamina propria, muscularis mucosae, or submucosa
T1a	Tumor invades lamina propria or muscularis mucosae
T1b	Tumor invades submucosa
T2	Tumor invades muscularis propria
T3	Tumor invades adventitia
T4	Tumor invades adjacent structures
T4a	Resectable tumor invading pleura, pericardium, or diaphgragm

T4b	Unresectable tumor invading other adjacent structures, such as aorta, vertebral body, Trachea, etc.

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in 1-2 regional lymph nodes
N2	Metastasis in 3-6 regional lymph nodes
N3	Metastasis in 7 or more regional lymph nodes

Distant Metastasis (M)

M0	No distant metastasis
M1	Distant metastasis.

STAGING :

Stage 0		T0 N0 M0
		Tis N0 M0
Stage I		T1 N0 M0
Stage II	**IIA**	T2 N0 M0
		T3 N0 M0
	IIB	T1 N1 M0
		T2 N1 M0
Stage III		T3 N1 M0
		T4 Any N M0
Stage IV		Any T Any N M1

CURRENT STAGING CLASSIFICATIONS

Based upon the survival analysis indicating tumour penetration and lymph node

metastases as the major prognostic factors,WNM (wall penetration, node and distant metastases) system for staging was developed by skinner et al.

In the Ellis classification, the W represents the depth of wall penetration (W0, muscularis mucosae; W1, submucosa and muscularis propria; W2, adventitia), N represents the number of positive lymph nodes (N0, none; N1, one to four; N2, >4), and M represents distant disease (M0, none; M1, any). In both systems, the depth of invasion and extent of local and regional lymph node involvement affect prognosis. However, the Ellis classification emphasizes depth of invasion and number of lymph nodes affects survival.

INVESTIGATIONS

1)**x-ray chest:**

The evidence of lung secondaries and plural effusion. Mediastinal widening can be noted

2)Esophagraphy

A barium esophagram is recommended for any patient presenting with dysphagia.

The esophagram provides an overview of anatomy and function.

It can differentiate intraluminal from intramural lesions and discriminate between

Luminal (from a mass protruding into the lumen) and extra luminal

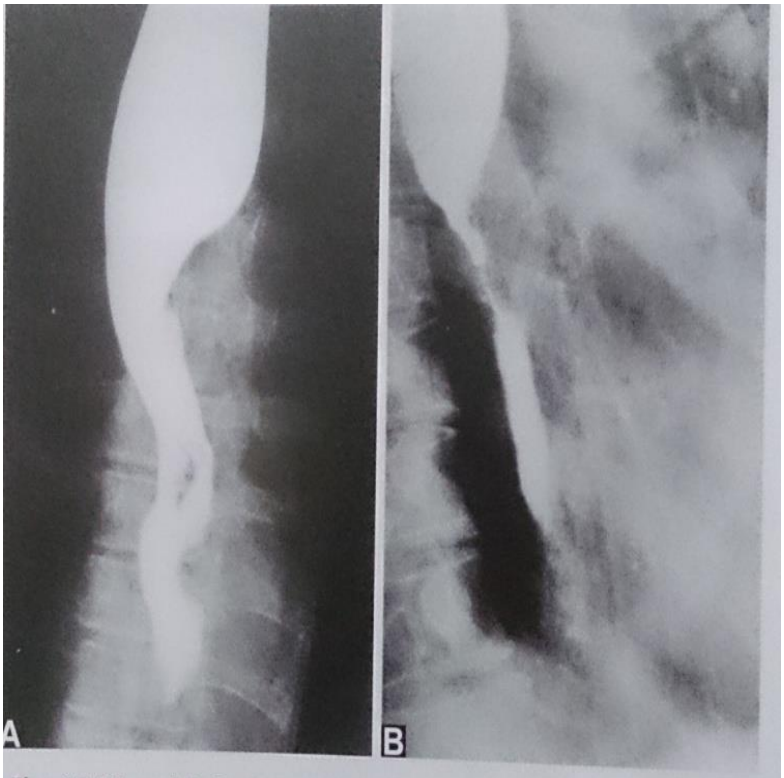
(from compression of a structures outside the esophagus) compression.

The classic finding of an apple core lesion in patients

with esophageal cancer is recognized easily, it is a good first test

to perform in patients presenting with dysphagia and a suspicion of carcinoma esophagus.

FIGURE 4: BARIUM SWALLOW STUDY



Figs 19.5A and B: Barium swallow X-rays showing narrowing and irregularity in carcinoma oesophagus.

Upper gastro intestinal Endoscopy

The diagnosis of esophageal cancer is best made from an endoscopic biopsy.

During endoscopy document the following things

1. Location of the lesion (with respect to distance from the incisors)

2. Nature of the lesion (e.g., friable, firm, polypoid)

3. Proximal and distal extent of the lesion

4. Relationship of the lesion to the cricopharyngeus muscle, GEJ, and gastric cardia

5. Distensibility of the stomach

These points is important in the management of esophageal cancer and guides the surgical therapy. Endoscopy performed by the operating surgeon before entering the operating room is must for a definitive resection.

FIGURE 5: UGI SCOPY SHOWING CARCINOMA ESOPHAGUS

Computed Tomography

CT scans are used for accurate staging.

A CT scan of the chest and abdomen is important to assess the length of the tumor, thickness of the esophagus and stomach, regional lymph node status and distant disease to the liver and lungs.

The regional lymph nodes are cervical, mediastinal, and celiac lymph nodes.

It is also helpful for determining T4 lesions which invades surrounding structures.

It can identify a tracheo- esophagial fistula or other anatomic variations.

The aortic wall invasion is predicted with an accuracy rate of 80% .

The overall CT scans accuracy is only 57% for T staging, 74% for N staging, and 83% for M staging.

Ultrasound abdomen

By doing USG abdomen we can find out the ascitis, lymph nodes, liver metastases.

Endoscopic ultrasound

EUS is used for staging of esophageal and EUS will help in medical and surgical therapy. The endoscopic ultrasound can identify

1) the depth and length of the tumor

2)degree of luminal compromise

3)status of regional lymph nodes

4)involvement of adjacent structures.

5) biopsy samples can be obtained from the mass

The accuracy of EUS for T staging correlates directly with increasing T stage.

For T1 lesions, EUS is 84% accurate, and 95% accuracy in estimating T4 lesions.

lymph nodes smaller than 1 cm tend to be evaluated less accurately.

The overall sensitivity (78%) and specificity (60%) of EUS for evaluating lymph nodes.

Magnetic Resonance Imaging

Measurement of esophageal wall thickness in the absence of luminal air are other contrast agents is difficult. Visualization of the middle third esophagus is complicated by artifacts resulting cardiac and respiratory motion. It can detect T4 disease and secondaries. At the same time, it tends to over stage the lymph node and T disease.

Bronchography

Bronchoscopy is performed in any patient presenting with a cough or evidence of a cervical esophageal cancer.

It is helpful to rule out a tracheoesophageal fistula or growth of tumors into the trachea. Blunting of the carina seen in metastatic involvement of the carina by the primary mass. Cytological sampling from the subcarinal node can be done.

Positron Emission Tomography

An 18F-fluorodeoxyglucose (FDG)–positron emission tomography (PET) scan evaluates the primary mass, regional lymph nodes, and distant disease.

Its sensitivity and specificity more than CT scan, but they remain low for definitive staging. The sensitivity and specificity of PET for evaluating metastatic disease are as high as 88% and 93%, respectively. For evaluation of lymph node disease, PET has a sensitivity (72%), specificity (86%), and accuracy (76%) equivalent to CT. As with CT, the ability of PET to evaluate local and regional lymph node disease is dependent on the location of the tumor, size of the lymph node, and technique of the scanner. PET appears to be an important piece of the diagnostic workup but is not reliable enough as a single diagnostic modality.

Other investigations

Mediastinoscopy is used for upper and middle thoracic esophageal lesions

to assess the mediastinal lymph nodes.

Percutaneous needle biopsy of suspected extra nodal metastases can be done.

The efficacy of the video assisted thoracoscopy is described by Kraska and collegues as

sensitivity is 80% and the specificity is 100%.

Laparoscopy can be done in patients with suspected sub diaphraghmatic involvement in

CT abdomen.

TREATMENT

Operative treatment

Middle thoracic and lower thoracic carcinomas

Lewis-tanner operation

Transhiatal esophagectomy

Three phase esophagectomy

Trans thoracic Esophagectomy(left/right thoracotomy approach)

Thoracoscopic esophagectomy

Cardia

Transhiatal esophagectomy

Esophagogastrostomy(left thoraco- abdominal approach)

Esophagogastrectomy(abdominal right chest approach)

Abdominal gastrectomy

Bypass

Kirschner gastric bypass

Colonic bypass

Jejuna bypass

In our hospital we are doing trans hiatal esophagectomy and thoracoscopic esophagectomy usually.

TRANSHIATAL ESOPHAGECTOMY

It is performed through an upper midline abdominal and cervical incision with out thoracotomy. Thoracic esophagus is resected through an widened diaphraghmatic hiatus and the neck.the stomach is mobilized by dividing left gastric and left gastro epiploic vessels. Right gastric and right gastro epiploic vessels preserved.

The entire thoracic esophagus from the level of clavicle to the cardia is resected. During this surgery we should care fully moniter intra arterial blood pressure to avoid prolonged hypotension resulting from cardiac displacement. The surgical stapler is used to fasion a gastric tube from the greater curvature of the stomach, while preserving the entire length.

The stomach is mobilized through the posterior mediastinum in the original esophageal bed and is anastamosed to the cervical esophagus.

For distal third esophageal tumours ,localized to the cardia, the high lesser curvature of the stomach is resected 4 to 6 cm beyond the gross tumour, while preserving the point on the high greater curvature that reaches cephaladfor the cervical esophago

gastric anastamosis. Critics of THE object to the limited exposure afforded by the hiatus to the intra thoracic esophagus. The limited exposure increases the risk of bleeding.

Contraindications to this surgery is evidence of tumour invasion of tumour invasion of the pericardium, aorta,trachea bronchial tree.

THORACOSCOPIC ESOPHAGECTOMY

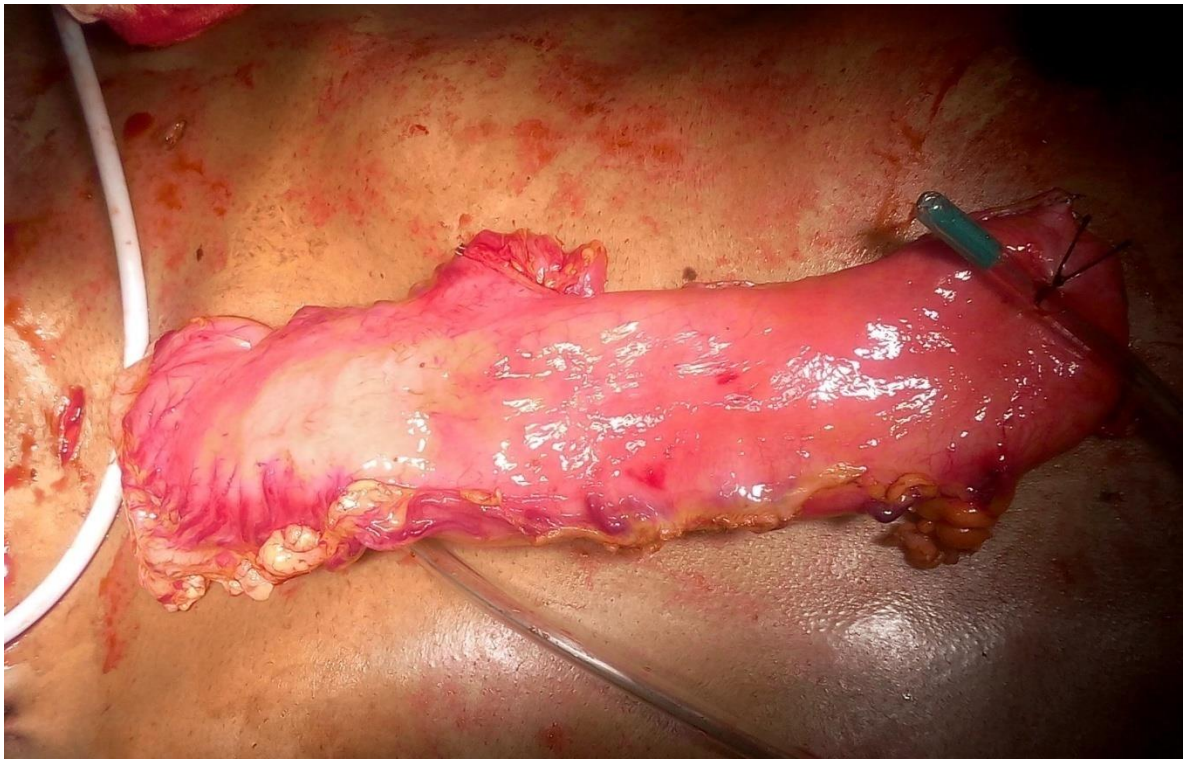
In our hospital we are doing Video assisted thoracoscopy / laparoscopy also in performing esophagectomy now.

In this procedure, thoracic esophagus is mobilized by right thoracoscopy,in a prone position. Followed by laparoscopic mobilization of cardiac end , and the stomach is mobilsed stomach tube is formed, anastomosed with the cervical esophagus.

FIGURE 7: SPECIMEN OF MIDDLE 1/3 CARCINOMA

RECONSTRUCTION AFTER ESOPHAGECTOMY:

FIGURE 8:



STOMACH TUBE - RECONSTRUCTION

After a portion of the esophagus is removed a conduit must be established for alimentary tract continuity. The **stomach, colon, and jejunum** have all been successfully

used as esophageal substitutes, but the stomach appears to be the conduit of choice because of it is easy mobilization and ample blood supply.

The mortality is very high in cases of triple anastomoses (coloesophagostomy, colojejunostomy, and colocolostomy)

RADIATION THERAPY

Patients who undergo external-beam radiation therapy, used alone in the treatment of esophageal carcinoma, have only 5-10% 5 year survival, so this therapy is not curative.

The relief of dysphagia is shortlived, and recurrence is seen usually within 6 months.

The range is from 5000cGy in 20 treatments over 4 weeks to 6600cGy in33 fractions over 7 weeks.

Complications of radiotherapy are pnueumonitis ,pericarditis ,myocarditis , stricture, fistula formation.

CHEMOTHERAPY

Chemotherapy is not a effective treatment in carcinoma esophagus as a single modality. Chemotherapy will treat systemic disease and help reduce the overall tumor burden. 5 fluro uracil and cisplatin are the mostly used drugs. However, it usually needs to be given in combination with radiation therapy so that control of the local tumor is obtained .

Treatment for Palliation

Palliative measures include chemotherapy, radiation therapy, photodynamic therapy, laser therapy, esophageal stenting, feeding gastrostomy or jejunostomy, and esophagectomy. These measures are aimed at reducing tumor burden or restoring nutritional access and should be considered in any patient who has no chance for cure or would not withstand the rigors of treatment for cure. Most studies dealing with neoadjuvant chemotherapy are based on combinations that contains cisplatin.response rates vary between 25-50% **Meluch and colleagues** treated 49 patients with localized esophageal cancer with paclitaxel, carboplatin, low dose 5FU with concurrent chemotherapy.

Dilatation is to palliate dysphagia and to allow endoscopic evaluation with a 2-3% risk of esophageal wall rupture or bleeding. Unfortunately, relief is measured only in weeks. Patints with high grade malignant strictures more likely present with advanced disease.

The purpose of **Stenting** , is to bridge the obstruction in the esophagus to allow luminal patency primarily to prevent poolingof saliva and secondarily for nutrition.

PHOTODYNAMIC THERAPY

For photodynamic therapy, a photosensitizer such as dihematoporphyrin ether, is given intravenously and after 2 to 3 days is retained in the tumour in a much higher concentration than in healthy tissue. Then a low power laser system that produces red light is delivered to the tumour by a flexible endoscope.

Two to three days after this therapy, esophagoscopy is repeated and the necrotic tissue is removed, often monthly. Complications include development of fistulas and aspiration. Edema of the face ,hand, sensitivity to light are the complications.

MATERIALS AND METHODS

This is a prospective study of 88 patients of carcinoma esophagus who were admitted in thanjavur medical college hospital from **September 2013-june 2015.** Total number of

carcinoma esophagus admitted in our hospital during this study period were 112. Out of which 24 patients in whom the carcinoma arising from cervical esophagus were excluded from the study.

METHODS

The methods include, obtaining the important information from the patients through history thorough clinical examination and doing the investigations, what ever is necessary to aid the diagnosis and respectability.

All the informations were entered in a proforma, specially designed for this study.

METHODOLOGY

The following factors were taken into consideration while evaluating the patients.

-Age and sex incidence

-Geographical factors

-Socio economic status

-Personal habits

-Symptoms and duration

-Predisposing factors

In all these patients, nourishment was noted.

Abdomen was examined for any mass, hepatomegaly, ascitis. Rectal examination was done, to find out bloomer' shelf. Respiratory system was examined to find out plural effusion and signs of aspiration pneumonia.

They were all subjected to **basic investigations** which included

1)urine albumin, sugar

2)blood hemoglobin

3)blood sugar

4)blood urea

5)serum creatinine

6)xray chest

Specific investigations such as

1) Upper GI Endoscopy and biopsy
2) Barium swallow
3) Ultrasound abdomen
4) CT thorax and abdomen

The upper GI Endoscopy was done in all patients and the biopsy was taken from the growth.the presence, location, type of growth and its distance from incisors were studied.

All patients who had a positive endoscopy and biopsy were submitted for **Ultrasono gram** of abdomen to rule out any metastases

CT Thorax was done to study the location of tumour, esophsgial wall thickness, extent of tumour. The presence of mediastinal lymphadenopathy and direct invasion of adjacent vital structures like Trachea, Aorta, Heart, etc., are noted and hence the respectability was noted.

CT abdomen revealed the presence of heparic, adrenal secondaries.

Broncoscopic examination was done in necessary cases to rule out trachea bronchial involvement.

After obtaining necessary informations from these investigations and clinical examinations planned for curative are palliative treatment, mainly **Transhiatal esophagectomy, Thoracoscopic esophagectomy, palliative feeding jejunostomy follow up radiotherapy** referral to radio oncology department

EXCLUSION CRITERIA

1. patients with carcinoma involving upper third esophagus(cervical)

2.patients with previously diagnosed and treated for carcinoma esophagus.

Totally 88 patients were diagnosed to have carcinoma esophagus. Out of 88 patients we found out 41 patients can undergo curative surgery, feeding jejunostomy in remaining 47patients done.

With available facilities in our hospital we adapted transhiatal esophagectomy in 37 patients and thoracoscopic esophagectomy in 3 patients , total gastrectomy with esophagectomy done in 1 patient.

Post operative complications were identified promptly and managed accordingly.most of our patients who underwent surgery, were reviewed in our OPD department.uring follow up we examined for complications like anastamotic leak,and evidence of recurrence, distant metastases.Patients who underwent feeding jejunostomy were referred for radio therapy.

OBSERVATIONS AND RESULTS

The incidence of carcinoma esophagus, by this study in our institution is 5.2% (112/2120)

Total number of cancer patients in our hospital during this study period were 2120.

Total number of carcinoma esophagus were 112.

TABLE 1 : AGE INCIDENCE

AGE GROUP(YEARS)	**NO.OF CASES**	**PERCENTAGE**
≤ 30	4	**5%**
31 -40	**11**	**13%**
41 – 50	**19**	**22%**
51-60	**22**	**25%**
61-70	**24**	**26%**
71 -80	**7**	**8%**
>80	**1**	**1%**
TOTAL	**88**	**100%**

FIGURE 8:

AGE DISTRIBUTION OF CARCINOMA:

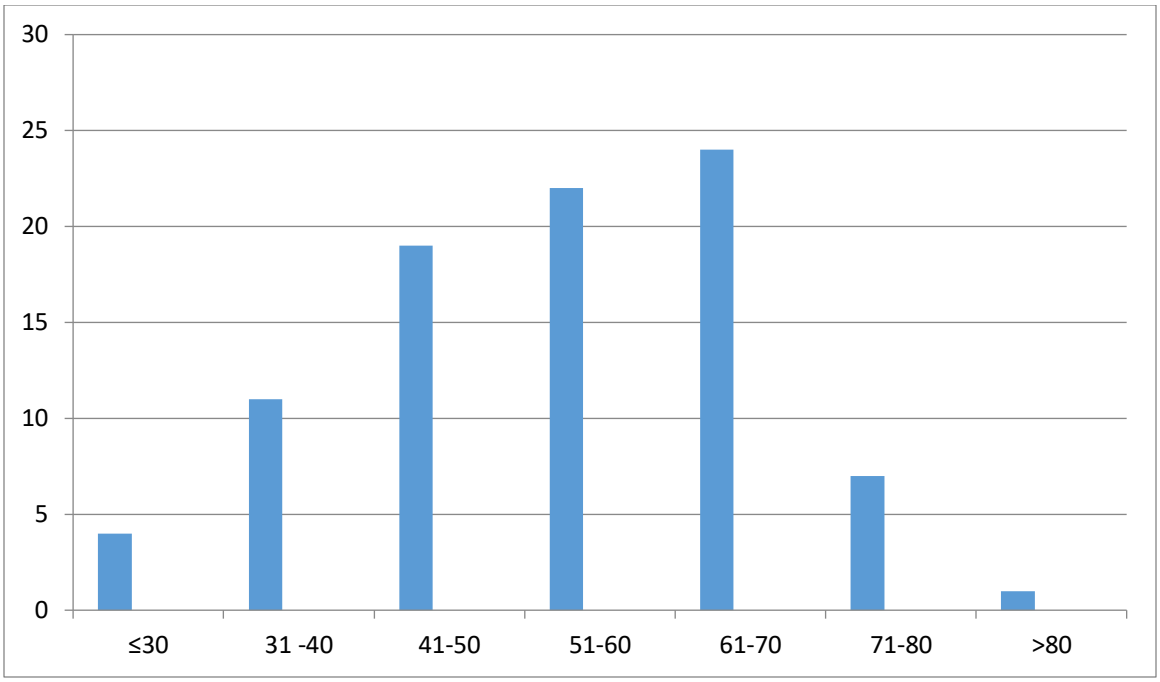
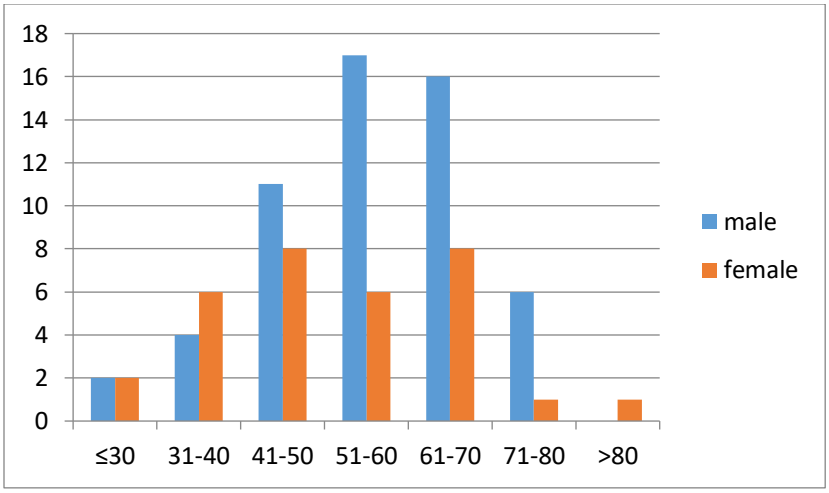


TABLE 2 : SEX INCIDENCE

Age group	males	percentage	Females	percentage

(years)				
≤30	2	2%	2	2%
31-40	4	5%	6	7%
41-50	11	13%	8	9%
51-60	17	19%	6	7%
61-70	16	18%	8	9%
71-80	6	7%	1	1%
>80	0	0	1	1%
total	56	64%	32	36%

FIGURE 9:



The relation of carcinoma of esophagus and personal habits has been well established in various studies

TABLE 3:

HABITS	NO.OF PATIENTS	PERCENTAGE
TOBACCO	8	9%
BETAL NUT	17	19%
SMOKING	27	30%
ALCOHOL	24	27%
2 or more habits	19	21%

According to our study **smoking(30%), Alcohol (27%)** users are prone to get carcinoma esophagus .

Next is the **betal nut** chewer contributes about **19%** .

Out of these 21% has 2 or more habits.

TABLE 4 :CLINICAL FEATURES

COMPLAINTS	Number of cases	percentage
Dysphagia	86	98%
Weight loss	55	62%
Anorexia	20	23%
Vomiting	15	17%
Abdominal pain	18	20%
Chest pain	3	3%
Cough	4	5%
Hoarseness	0	0%
Dyspnoea	3	3%
Malena	2	2%

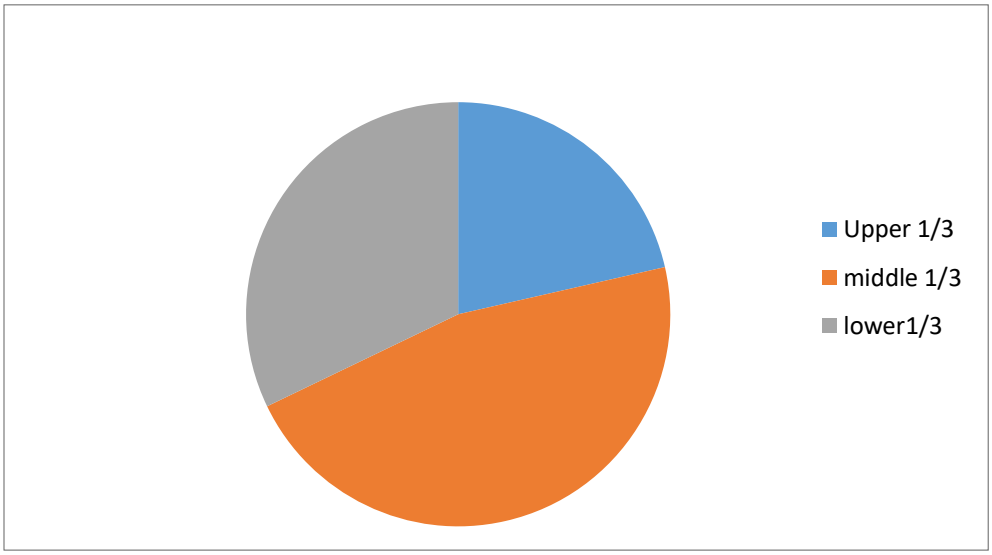
Among the presenting complaints , the commonest and in many a times the only complaint was **dysphagia(98%).** The second most common was the **weight loss(62%)** next is the anorexia and abdominal pain, vomiting. All other symptoms was very less, and those symptoms were due to metastases or complications. No one patient was having hoarseness of voice.

TABLE 5:

Distribution of tumour according to site of tumour

location	Number of cases	percentage
Upper1/3	24	21%
Middle 1/3	52	48%
Lower 1/3	21	18%
OGJ	15	13%

FIGURE 10:



There was a considerable variation in the statistics as for as the location of the tumour is considered. The commonest site of the carcinoma of esophagus was the lower 3rd on our institution, about 52 patients were having middle third carcinoma (46%). Lower 3rd along with OGJ contributes 31% (36) cases.

Various studies have documented a major shift in the histological pattern of the cancer esophagus, with a double fold rise from a traditional squamous cell carcinoma to adenocarcinoma over the last few decades. But, observations made in our study results do not correlate well with the changing trend as far as the histological pattern is concerned. The commonest histological pattern is still squamous cell carcinoma in our institution.

TABLE 6 : OGD SCOPY FINDING

TYPE OF GROWTH	**NUMBER OF CASES**	**PERCENTAGE**
Fungating	3	3%
Ulcerative	45	51%
Infiltrative	38	43%
polypoid	2	2%

Most of patients (51%) were found to have ulcerative growth. Infiltrating type growth (43%)were the second most common type of growth. Rarely about 3 % were polypoid growth.

TABLE 7 : HISTOLOGICAL VARIETIES

TYPE	NUMBER OF CASES	PERCENTAGE
SQUAMOUS	70	80%
ADENO	18	20%
TOTAL	88	100%

FIGURE 11:

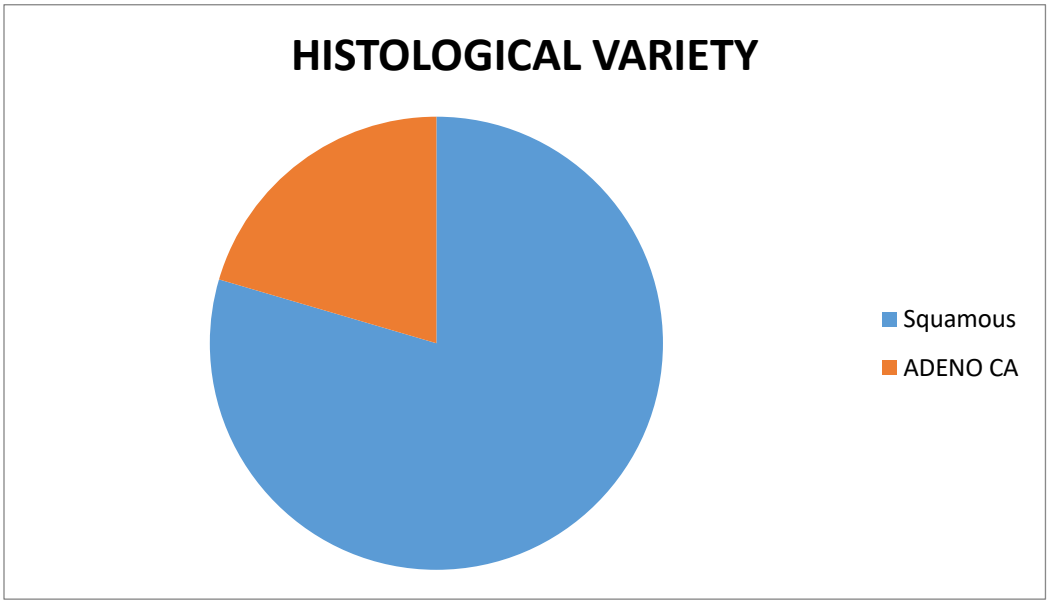


TABLE 8 : CURATIVE AND PALLIATIVE SURGERY

SURGERY	NO.OF CASES	PERCENTAGE
Trans hiatal esophagectomy	**37**	**42%**
Thoracoscopic Esophagectomy	**3**	**3%**
Feeding Jejunostomy	**47**	**54%**
Total gastrectomy with Esophagectomy	**1**	**1%**

Patients were selected for curative surgery according to their general condition, scopy findings, extent of disease, histological grade of lesion, with out any metastases and complications. Patients selected for curative surgery were planned for either transhiatal esophagectomy or thoracoscopic esophagectomy.

Patients in whom there is no curative resection possibility , underwent feeding jejunostomy and follow up Radiotherapy.

Out of those 88 patients, 47 patients were underwent feeding jejunostomy followed by radio therapy. These 47 patients had one of these following exclusion criteria.

TABLE 9 : PATIENTS UNDERWENT PALLIATIVE FJ

FACTORS	NUMBER OF CASES	PERCENTAGE
>80 years	2	2%
Co morbid illnesses	4	5%
Poor general condition	8	9%
Extensive growth	24	27%
metastases	6	7%
Not willing for major surgery	3	3%
TOTAL	**47**	**53%**

About 2 patients were in **extreme age**. 4 patients had **co morbid illness** like recent attack of Myocardial infarction (2) , complete heart block (1) , and severe COPD(1). 8 patients had very **poor general condition** made them unfit for surgery. 24 patients had **extensive growth** that explains biological nature of the disease. 6 patients had **metastases** to adjacent structures , such as bronchi, loss of fat plane and abutment between the aorta and esophagus and distant metastases like liver secondaries and ascitis, diagnosed by pre operative CT chest and USG abdomen and CT abdomen. 3 patients were refused for major surgery after explaining the post operative morbidity and mortality

All these patients undergone palliative feeding jejunostomy and referred to Radio Therapy unit for further management.

Patients (41) who had curative surery like trans-hiatal esophagecomy , thoracoscopic esophagectomy had following post operative complications.

TABLE 10:

COMPLICATIONS	NUMBER OF CASES	PERCENTAGE
Wound infection	3	7%
Anastomotic leak	6	14%
Stricture	1	2%
Wound dehiscence	4	9%
Pneumonitis	2	5%
Hemothorax	0	0%
Death	1	2%
Total	17	39%

3 patients had wound infections and 4 patients had wound dehiscence were managed conservatively and settled in follow up of those patients. 6 patients had anastamotic leak in post operative ward itself, those were managed as in patients, conservatively.

Leak stopped and discharged after that. 2 patients developed pnemonitis treated medically. 1 died in post operative period itself.

According to above observations immediate postoperative mortality was 2%.

Follow up periods of (41) patients were variable.

TABLE 11 :

PERIOD	NUMBER	PERCENTAGE
<1 MONTH	2	4
1 – 3 MONTHS	5	12
4-6 MONTHS	7	17
7-12 MONTHS	15	36
1 -1 ½ YEARS	4	9
1 ½ - 2 YEARS	3	7
LOST FOR FOLLOW UP	5	12

During follow up visits patients wer subjected to investigations to find out any recurrence and any evidence of metastases. Those patients were referred for radiotherapy department in our hospital for further management.

Since the study period was 1 year 10 months survival rate could not be calculated with these above data.

STASTICAL ANALYSIS

	SCC	**ADENO.CA**	**Marginal row total**
SMOKERS	16(21.48)(1.4)	11(5.52)(5.43)	**27**
NON-SMOKERS	54(48.52)(0.62)	7(12.48)(2.4)	**61**
TOTAL	**70**	**18**	**88**

Chisquare stastic is 9.8517

"p" value is 0.001697

This result is **significant** at $p<0.05$.

	SCC	**ADENO**	**TOTAL**
ALCOHOL	16	8	**24**
NON-ALCOHOL USERS	54	10	**64**
	70	**18**	**88**

Chisquare stastics is 3.364

"p" value 0.0495, **significant** at <0.05

SITE OF CARCINOMA	CURATIVE SURGERY	FJ	TOTAL
Middle 1/3	28	24	52
Lower 1/3	13	23	36
total	41	47	88

The chi-square stastic is 2.6889. The "p" value is 0.10 >0.05

It is not significant.

	SCC	ADENO CA	TOTAL
CURATIVE SURGERY	34	7	41
FJ	36	11	47
	70	18	88

Chi-square stastic is 0.5394

"p" value is 0.46 > 0.05 not significant.

DISCUSSION

EPIDEMIOLOGY, SEX AND AGE INCIDENCE

The epidemiological characteristics of esophageal carcinoma are unusual, since the incidence in different geographic areas is extremely variable, with the greatest differences recorded for all tumours. The incidence of esophageal carcinoma varies from 8.1% recorded at Chennai registry to 4.6% in Delhi. The incidence as per the surveillance made by the National Cancer Registry Project (NRCP) quotes an incidence of 8.6% at Bangalore and 6.8% AT Mumbai. The incidence of carcinoma esophagus in our institution is 5.2%.

As per the study, the rise in esophageal cancer commences in the thirties and peaks in the 6^{th} decade. Studies conducted both in India and abroad, show peak incidence in the 7^{th} and 8^{th} decades.

ETIOLOGY AND RISK FACTORS

All the patients in our study, who presented with esophageal carcinoma were of the lower socioeconomic group. **Day and Munoz, 1982** and **Scottenfeld 1984** , and several other

series have shown an association between esophageal cancers and low socioeconomic status.

Low levels of retinol, riboflavin, ascorbic acid and alpha tocoferol are prevalent in population of Linxian, china where esophageal cancer is epidemic. In Japan, poor food variety has been identified as a risk factor and combination of fruits and vegetable, sand fresh meat appear to be risk reducing factors.

De Carli et al 1989 has stated that low intake of fruits, particularly citrus fruits has much of vitamin C associated with increased risk deficiency of Zinc, Molybdenum, also cited as possible etiological factors.

Francheschi et al 1990 discovered that deficiencies are believed to make one more susceptible to the carcinogenic effects of exogenous factors.

From the data given in our study there is strong association between the use of tobacco in both of its forms of usage (chewing, smoking)

The most important risk factors for cancer esophagus in developed countries are cigarette smoking (**IARC 1986**) alcohol consumption (**IARC 1988).** The association between

cigarette smoking and alcohol consumption and esophageal cancer are difficult to separate, largely because of the correlation in the two exposure and their mutual association with the risk of cancer esophagus.

The risk of esophageal cancer has shown to be increased among non tobacco smokers who consumes alcohol and non-drinkers of alcohol who smokes tobacco. (**La Vecchia and Negri 1989)**

The role of alcohol consumption was not clearly demonstrated in the French Department of Ille-et-Villaine where the risk rose steadily with the amount of alcohol consumed (**Tuyns et al 1977)**

The risks associated with tobacco use appears to increase with the number of cigerettes smoked per day, duration of smoking and tar content **(Tuyns et al 1979; Rossi et al1982; Yu et al 1988)**

The synergistic effect for the combined habit of alcohl drinking and tobacco smoking or chewing has also been reported.

MORPHOLOGICAL TYPE AND LOCATION

The prominent histological type noted in our hospital is squamous cell carcinoma (80%)

In Europe and America adenocarcinoma is more prevalent.

Stiger et al 1987 , stated that primary adenocarcinoma represent 3- 8 % of the esophageal cancer. Observations made in our study also show a rise in the incidence of adenocarcinoma. (20%)

Esophageal cancer is usually located in the middle third in about 50% and in upper and lower third esophagus contributes only less.**(Guili and Gignoux 1980).**

In our study , we found same result as that of **Guili and Gignoux 1980** The middle third carcinoma is contributing about 48% **.**

Lower third and upto OGJ were about 31% .Carcinoma in Upper third is 21%

SURGICAL THERAPY

In the past the esophagial surgery was burdened by high operative morbidity and mortality rates (**Lauis et al 1983).** There has been a remarkable reduction in these rates in the last 10 years.

The preoperative care of a patient who has to undergo esophagectomy should include a prophylaxis for any postoperative complications, especially respiratory problems.. smoking should be stopped at least 10 days before surgery. And in the presence of

pulmonary problems, physiotherapy is advisable together with operative broncho dilatation treatment. If the patient with malnutrition hypercaloric parentral nutrition or tube feeding at 2500 to 3500 calories per day advisable for a period of 7 – 10 days.(**Moghissi et al 1977)** .

The selection of patients for transhiatal esophagectomy is very important in computing to the outcome. Most of the time it depends upon the general condition of the patient and the tumour stage.

The contraindications for esophagectomy can be relative to the patient or to the tumour. At present an elderly patient **(Perecchia et al 1988)** ,length of the tumour and concomitance of Child-A risk liver cirrhosis (**Fekete et al 1987)** are not considered as absolute contraindications for surgery.

SURGICAL APPROACH

Transhiatal esophagectomy without thoracotomy (**Orringer et al 1993)** has been performed by an increasing number of authors in recent years. It is performed by isolating the mediastinal esophagus through a cervicotomy and laparotomy (**Orringer et al 984, 1987.)** We at TMCH , have adopted this technique in the selected patients, for so many years.

In the recent time we adopted Thoracoscopic esophagectomy and the operative morbidity and mortality is less with this technique. All 3 cases who undergone thoracoscopic esophagectomy had less post operative morbidity and mortality.

Akiyama et al 1978 stated that stomach is the viscus of choice to replace the esophagus resectaed for cancer. It is isolated tubulized before transposition.according to this statement stomach tubulization allows removal of the lypmhnodes located the gastric vessels, a possible metastasis station, improves the gastric vascularisation and avoids mediastinal encumbrance which is possible when the whole stomach is transposed.

Interpositioning of colonic segment and the transposition of a Roux en Y loop of jejunum was done on one case of lower esophageal cancer .

In our institution, Esophago- gastric anastomosis done by hand sewn technique.

Wong et al 1987 identified that the main post operative complication is the anstomotic leakage. The anastomotic leakage rate in our cases is well within our acceptable range.

It was about 14%.

RESULTS OF SURGICAL RESECTION

Contrasting data regarding the respectability rates and the long term survival rates are reported in literature, that is because varying criterias for the selection of patients for different types of treatment , biological behavior of the disease.

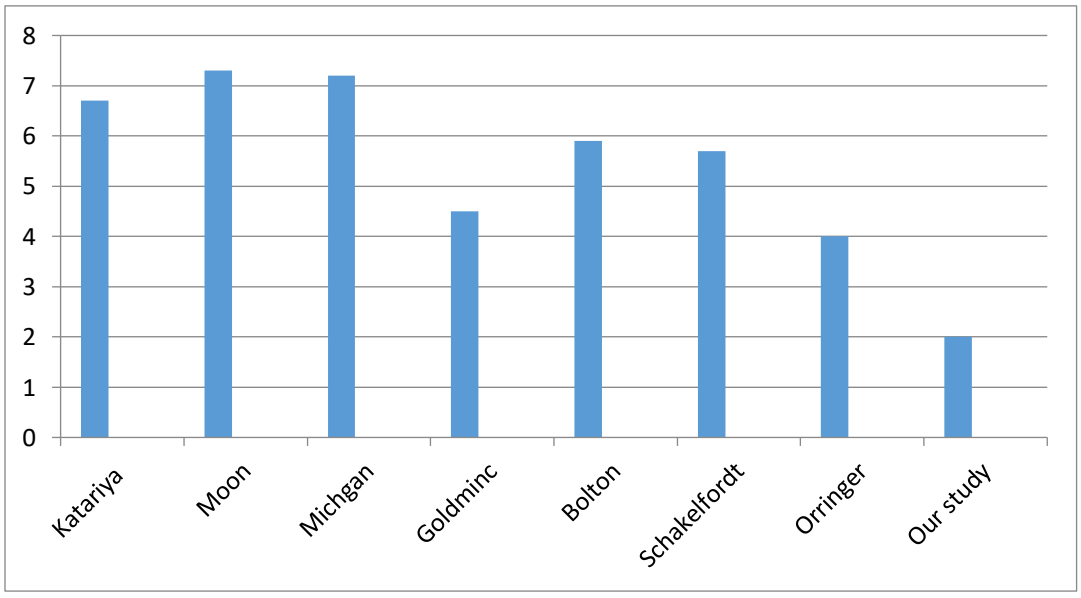
Observations in our study , the mortality rate of about 2.0%

TABLE 12 :POST OPERATIVE MORTALITY

STUDIES	PERCENTAGE
Katariya et al	6.7%
Moon et al	7.3%
Michigan university	7.2%
Goldminc et al	6.4%
Bolton et al	5.9%
Schakelfordt et al	5.7%
Orringer et al	4.0%

Our study	2.0%

FIGURE 12:



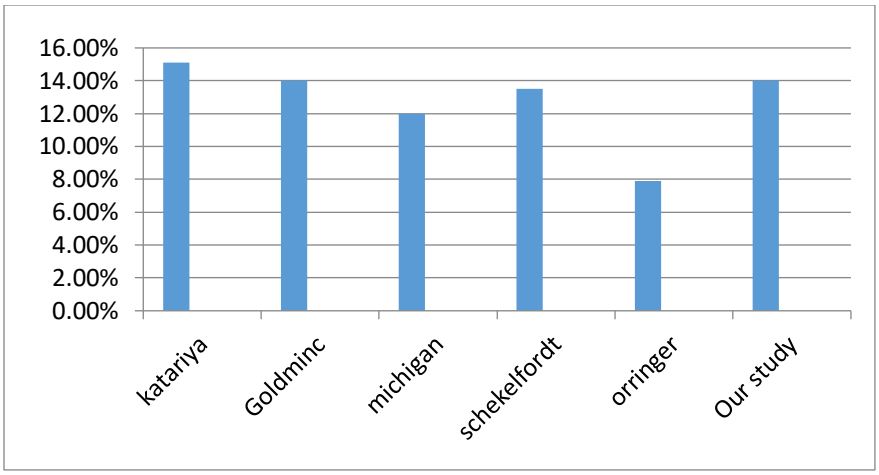
Anastomotic leak observed in our study is about 14% .

All were managed conservatively

TABLE 13:

STUDIES	ANASTOMOTIC LEAK
Katariya et al	15%
Goldminc et al	14%
Michigan university	12.0%
Schekelfordt et al	13.5%
Orringer et al	7.9%
Our study	14%

FIGURE 13:



1 year survival rate according to our study is 25%.

Since the study period is very less , we are unable to calculate the

5 year survival rate.

CONCLUSION

Carcinoma esophagus is one among the cancers that hav increased male: female ratio.

More commonly occuring in a low socioeconomic groups.

The predominant histology is squamous cell variety.

There is significant rise of adenocarcinoma.

A strong association coexists between carcinoma esophagus with smoking and alcoholism

Transhiatal esophagectomy and thoracoscopic esophagectomy scores significant role in surgical management of lower 1/3 and middle 1/3 carcinomas.

Around 50% of the patients when diagnosed is in inoperable stage.

Inoperability is due to biological nature of the disease, in which feeding jejunostomy and followup RT is the treatment option.

Significant 1 year survival rate can be achieved by with transhiatal as well as thoracoscopic esophagectomy.

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CONSENT FORM

I _____

here by give consent to participate in the study conducted by postgraduate in Department of General Surgery, Thanjavur Medical College, Thanjavur Medical College& Hospital, Thanjavur.,and to use my personal clinical data and result of investigation for the purpose of analysis and to study the nature of disease. I also give consent for further investigations.

Place :

Date :

Signature of the participant

PROFORMA

NAME	AGE	SEX
OCCUPATION	IP.NO	UNIT/WARD

ADDRESS

COMPLAINTS:

HISTORY OF PRESENT ILLNESS

DYSPHAGIA	DURATION
ODYNOPHAGIA	HOARSENESS
CHEST PAIN	COUGH
ANOREXIA	DYSPNOEA
WEIGHT LOSS	HEMOPTYSIS
REGURGITATION	HEMATEMESIS
MALENA	OTHERS

PAST HISTORY

IRRDIATION	DIVERTICULA

CORROSIVE STRICTURE	TYLOSIS
BARRETS	OTHERS
PV SYDROME	

PERSONAL HISTORY

DIET	SMOKING
ALCOHOL	TOBACCO
BETAL NUT	OTHERS

FAMILY HISTORY

MARITAL STATUS

PHYSICAL EXAMINATION

PR	BP	RR
BUILT	NUTRITION	ANEMIA
JAUNDICE	LYMPHADENOPATHY	

LOCAL EXAMINATION

MOUTH AND PHARYNX

NECK

CHEST

ABDOMEN

SPINE AND CRANIUM

INVESTIGATIONS

URINE	HEMOGLOBIN
RBS	UREA
CREATININE	ELECTROLYTES
ECG	CHST XRAY

ENT OPINION

BARIUM SWALLOW

ENDOSCOPY

BIOPSY

USG ABDOMEN

CT THORAX & ABDOMEN

FNAC OF LYMPH NODE STATUS

TREATMENT

TRANSHIATAL ESOPHAGECTOMY

THORACOSCOPIC ESOPHAGECTOMY

FEEDING JEJUNOSTOMY

RADIOTHERAPY

POST OPERATIVE COMPLICATIONS

FOLLOW UP

S.NO	NAME	AGE	SEX	IP NO	COMPLAINTS	HABITS	SITE	BIOPSY	METS	TREATMENT	FOLLOW UP
1	RAJAPPA	65	M	37372	D, LW, LA	B, S	M	S	-	THE	2M
2	KASINATHAN	56	M	38747	D, MA,	S	OGJ	A	-	THE	-
3	RAMASAMY	59	M	40728	D,LW	T,B	OGJ	A	-	THE	15days
4	KENNADY	47	M	33799	AP,V	S,A	OGJ	A	ASCITIS	FJ	
5	GOVINDHAMMA	70	F	36608	D,V	B	OGJ	A	-	THE	6M
6	JEGANATHAN	60	M	11333	D,LW,LA	S,A	L	S		FJ	
7	AROCKIYAMARY	62	F	10782	D,LW	T	M	S		THE	1Y
8	AKILAMBAL	60	F	1655	D,LW	-	M	S		FJ	
9	LAKSHMI	37	F	2684	D,LW	B	M	S		THE	3M
10	CHITHRA	40	F	2167	D,LW	-	M	S		FJ	
11	MATHEW	58	M	65826	D,LW,LA,AP	A,SF	OGJ	A		FJ	
12	UTHIRAPATHY	53	M	63472	D,LW	S	M	S		FJ	
13	MARIYAMMAL	90	F	63484	D,LW,LA	B	M	S		FJ	
14	SELVAM	49	M	62275	D,LW	A	M	S		THE	-
15	KALYAPERUMAL	60	M	62752	D,V,LW	S	L	S		FJ	
16	KEERIPILLAI	72	M	61428	D,V	A	L	A		FJ	
17	SELLAM	70	F	60291	D,V	-	L	S		FJ	
18	VENUGOPAL	62	M	59067	D,LW	S	M	S		FJ	
19	CHANDRABABU	58	M	57846	AP,V	A	OGJ	A		FJ	
20	RAJAMANICKAM	65	M	57688	D,LW	B	M	S		THE	6M
21	AROCKIYASAMY	50	M	57241	D,LW,LA	S,A	L	S		FJ	
22	PITCH KANNU	65	M	54162	D,LW,LA,CP	T,B	M	S		FJ	
23	KALYANI	29	F	32845	D,AP	-	L	S		THE	9M
24	KALA	45	F	31881	D	B	M	S		THE	8M
25	SUYAMPRAKASAM	60	M	28295	D,AP	A,S	OGJ	S		THE	3M

S.NO	NAME	AGE	SEX	IP NO	COMPLAINTS	HABITS	SITE	BIOPSY		TREATMENT	FOLLOWUP
26	RADHAKRISHNAN	70	M	24431	D,AP,LW,V	A,S	OGJ	A		TEG	10M
27	BHARATHIMOHAN	40	M	14532	D,AP,V	S	M	S		TLE	7M
28	RADHAKRISHNAN	67	M	16202	D,LW,LA	A,S	M	S		FJ	
29	AMUTHAN	50	M	11252	D,LW	A,S	M	S		FJ	
30	RAJESWARI	45	F	13021	D	B	M	S		THE	6M
31	SEETHA	41	F	6977	D,LW,LA	-	M	S		FJ	
32	MAHALAKSHMI	35	F	8825	D,LW	B	M	S		TLE	6M
33	KARUPPAIYA	65	M	61428	D,LW,LA	A	M	S		FJ	
34	UTHIRAPATHY	53	M	63472	D,MA	A,S	M	S		FJ	
35	VAIRAKKANU	65	M	2642	D,V	A,S	L	S	LI 2°	FJ	
36	GOVINDHAMMAL	70	F	26193	D,AP	T	OGJ	A		FJ	
37	KRISHNAVENI	55	F	24742	D,AP,V,LW	B	OGJ	A		FJ	
38	GURUMOORTHY	50	M	24719	D,C,CP	S	M	S	LU 2°,BR	FJ	
39	NAGOORAN	55	M	33774	D,AP,F	A,S	M	S		FJ	
40	BAVAJ	72	M	35944	D	-	M	S		FJ	
41	GOVINDHAMMAL	70	F	36608	D,AP,LW,LA	T	L	S		THE	3M
42	MANIMEGALAI	70	F	38305	D,CP,	T	M	S	BR	FJ	
43	SARATHKUMAR	42	M	36585	D,AP,LW,AL	A,S	M	S	LI 2°	FJ	
44	YASODHAI	45	F	1469987	D,LW	B	L	S		THE	10M
45	PAKKIRISAMY	80	M	1661	D,LW	-	L	S		THE	2M
46	NAGALAKSHMI	45	F	1484206	D	T	M	S		FJ	
47	JAYALAKSHMI	45	F	1484211	D,LW	T,B	M	S		THE	1Y2M
48	RAVI	40	F	4041	D,LW,LA	-	L	S		THE	-
49	CHITHRA	32	F	38253	D,LW	-	M	S		FJ	
50	RAMALINGAM	63	M	37248	D,LW	-	OGJ	A		THE	11M

S.NO	NAME	AGE	SEX	IP NO	COMPLAINTS	HABITS	SITE	BIOPSY	CT	TREATMENT	FOLLOWUP
51	RAJAKANNU	58	M	35466	D,AP,V	-	OGJ	A		THE	11M
52	JAYAKUMAR	41	M	23584	D,LW	-	L	S		THE	-
53	SADHASIVAM	53	M	22436	D,LW,LA	A	M	S		THE	10M
54	SURESHKANNAN	30	F	53264	D,LW,LA	S	L	S	BR	FJ	
55	MURUGESAN	60	M	51633	D	S	M	S		THE	1Y3M
56	MAHALINGAM	67	M	52032	D,V	A	L	A		THE	4M
57	PITCHI	65	M	49582	D	-	M	S		THE	9M
58	RAJESH	30	M	48936	D,AP,V,LW,LA	A,S	L,OGJ	S	No fat plane	FJ	
59	CHANDRAN	57	M	48427	D	-	M	S		THE	10M
60	THIGARAJAN	66	M	47276	D,LW	A	M	S		THE	11M
61	ARUDAI	65	M	39519	D,LW	-	L	S		FJ	
62	BABU	45	M	40459	D	S	M	S		THE	21days
63	RANJITH	30	M	40759	D	S,A	M	S		THE	8M
64	LAKSHMI	52	F	44468	D,LW	-	M	S		TLE	1Y
65	JAYARANI	60	F	46097	D,LW,LA,V	-	L	S		FJ	
66	MARIYAMMAL	45	F	47531	D	-	M	S		THE	9M
67	GOPAL	45	M	20243	AP,AD	A,S	OGJ	A	ASCITIS	FJ	
68	NALLATHAMBI	55	M	19650	D	A	L	S		THE	9M
69	KRISHNAVENI	55	F	21348	D,LW	-	L	S		THE	5M
70	BELOJI	72	M	22769	D,LW,LA	-	M	S		FJ	
71	BASKER	40	M	25163	D,AP	-	M	S		FJ	
72	SANTHAKUMAR	42	M	36585	D,LW	S	M	S		THE	-
73	SHANTHI	33	F	18766	D,LW	-	M	S		FJ	
74	AMSAVALLI	45	F	10334	D	-	M	S		THE	1Y10M
75	ANJALAI	70	F	10153	D,LW,LA	B	M	S		FJ	
76	RAMAKRISHNAN	74	M	10863	D,AP,LA,LW	B	L	A		FJ	

S.NO	NAME	AGE	SEX	IP NO	COMPLAINTS	HABIT	SITE	BIOPSY	CT	TREATMENT	
77	RAMAIYAN	75	M	12654	D	T	M	S		FJ	
78	CHELLAPPA	40	M	14741	D,LW	-	OGJ	A		FJ	
79	THAMBIRAJ	60	M	17268	D,AP	A	OGJ	A		FJ	
80	CHITHRAVEL	65	M	18383	D,LW	-	M	S		THE	1Y8M
81	KRISHNAMOORTHY	60	M	45338	D,LA,V	-	OGJ	A		FJ	
82	SELVARAJ	70	M	74125	D,LW,LA	-	M	S		FJ	
83	KEERTHIVASAN	45	M	59704	D	S	M	S		THE	5M
84	KARUPAIYA	70	M	65450	D,LW	B	M	S		FJ	
85	NEELAVATHY	60	F	6091	D,LW	-	L	S		FJ	
86	GOWRAMMAL	65	F	65098	D,LW	B	M	S		THE	11M
87	GOVINDHARAJ	75	M	54832	D,LW	-	M	S		FJ	
88	MANIKANDAN	40	M	53409	D,LW	A,S	M	S		THE	1Y7M